

MARKET REACTIONS TO NON-FINANCIAL RESOURCE DISCLOSURES AND REPUTATION EFFECTS OF GEOLOGICAL EXPERTS

Gabriel Pereira Pündrich

**A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy**

May 2014

**Accounting Discipline Group
University of Technology, Sydney**

Supervised by:

Professor Andrew Ferguson

Dr. Robert Czernkowski

Dr. Peter Lam

CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student: Gabriel Pereira Pündrich

Date: 05/05/2014



Gabriel Pereira Pündrich

ACKNOWLEDGMENTS

I would like to express the deepest appreciation to the support of my principal supervisor, Professor Andrew Ferguson. Thank you for this opportunity, your guidance, motivation and mentoring during all these years. Without your supervision and constant help this dissertation would not have been possible.

I would like to thank the assistance of Dr. Peter Lam and Dr. Robert Czernkowski, particularly in regards to editorial advice. I also benefited from the advice and help of my fellow PhD students: Alexey Feigin, Adrian Raftery, Thomas Scott, Matt Grosse, Stephen Kean and Nelson Ma. Thanks to all the help from UTS staff members, students, and visitors. I also acknowledge receiving financial support from UTS.

I also acknowledge the editorial advice of Mark MacLean, whose editorial service was paid for by the UTS Editing of Thesis Fund.

I would also like to thank Professor Dan Collins for inspiring me to do both interesting and rigorous research. Many thanks for the friendship and support from the University of Iowa PhD students, including Bradford Hepfer, Katie Hepfer, Gerrit Lietz, Phillip Quinn and Steven Savoy.

Special thanks to friends who made me feel at home in Australia: Francesco Giacobbe and family; Fabio Iskandarian; Nathalia Zuckerman; Camila Tree; Alex Barcelos; Heloisa Hertzog; Guilherme Ramos; Rossana Ruschel; Damian Ham and Tatuira.

Last and most importantly, I dedicate this thesis for my family, whose support and love was fundamental to go through this journey. Thanks to Ricardo Pündrich, Vera Lucia Pündrich, Elaine Pündrich, Aline Pündrich, Leandro di Domenico and Luca di Domenico.

ABSTRACT

Previous studies in the financial economics literature highlight the value of non-financial information to investors for Internet and telephony stocks (Amir and Lev 1996, Trueman, Trueman and Zhang 2001). Other studies consider the financial performance implications of assurance of non-financial information such as ISO 9000 certification (Corbett, Montes-Sancho and Kirsch 2005) and Total Quality Management awards (Hendricks and Singhal 1997). This thesis provides evidence on the value of non-financial disclosure and assurance in a high information asymmetry setting. Specifically I examine market reactions to resource/reserve disclosures by Australian Mining Development Stage Entities (MDSEs) and the reputational effect of geological experts associated with these disclosures. I might expect geological assurers to matter given that the information environment of MDSEs is characterised by high information asymmetry and the reality that non-financial technical information supersedes financial statement information in terms of importance in firm valuation. In contrast however, the litigation risk attached to such disclosures is argued to be very low, given the absence of cases involving geological attestors. This aspect of the setting suggests the absence of any insurance effect, which might suggest geological assurers won't matter to the market.

Public accounting firms audit and review financial figures compiled by a client. Essentially, the role of auditors is to ensure compliance with Generally Agreed Accounting Principles (GAAP). In contrast, geological assurers are unique in that they receive mineral assay data from clients and then compile the resource estimates that are subsequently announced by the client firm to the market. Thus geological assurers have an information generation role along with a compliance role in that they are required to produce estimates in accordance with the Joint Ore Reserve Committee (JORC) code.

In this thesis I document a significant, positive market reaction to resource/reserve disclosures by MDSEs. Using size of geological experts as a proxy for their reputation, I find weak evidence of greater abnormal returns when these disclosures are assured by larger geological experts. Further, a measure of expert specialisation based on commodity cluster leadership produces the strongest positive and significant results. In supplementary analysis, I test for the implications of switching geological experts and find that firms experience significant, positive abnormal returns when their successor expert is larger. Overall, the weak evidence I documents in this thesis is consistent with an insurance effect interpretation, in that the reputation of geological assurers doesn't matter to the market where litigation risk is low.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	ii
ABSTRACT	iii
LIST OF TABLES	xi
LIST OF FIGURES	xii
1. INTRODUCTION.....	1
1.1 Overview	1
1.2 Motivation	4
1.3 Objectives and research questions	6
1.4 Summary of major findings and contributions	6
1.5 Structure of the thesis.....	7
2. RESOURCE/RESERVE DISCLOSURES AND GEOLOGICAL EXPERTS ...	9
2.1 Introduction	9
2.2 Resource and reserve disclosures	9
2.3 Competent Person.....	11
2.3.1 Liability profile of the Competent Person.....	12
2.3.2 The A1 Minerals case	14
2.4 Descriptive statistics	16
2.4.1 Sample identification	16
2.4.2 Variable description.....	18
2.4.3 Market structure of geological experts	22
2.4.4 Summary statistics	26
2.5 Summary	28
2.6 Chapter 2 figures and tables	29
3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT	51
3.1 Introduction	51
3.2 Disclosure research in the extractive industries	51
3.3 The market for ‘lemons’	57
3.4 Underwriter expertise.....	59
3.4.1 Underwriter reputation.....	60
3.4.2 Underwriter switching	68

3.5	Experts and takeovers	73
3.5.1	Eddey (1993)	73
3.5.2	Bugeja (2005)	75
3.6	Auditor reputation and the capital markets	77
3.6.1	Auditor quality and auditor size	79
3.6.2	Auditor industry specialisation	83
3.6.3	Auditor switches	87
3.6.4	Auditing by geological experts	88
3.6.5	Auditing and assurance effects in the capital markets setting	92
3.7	Non-financial information and the capital markets	99
3.8	Hypothesis development	104
3.8.1	Market reaction to non-financial information	104
3.8.2	Reputational effect of geological experts associated with non-financial disclosures	105
4.	RESULTS	110
4.1	Introduction	110
4.2	Sample and data collection	111
4.3	Research design	112
4.3.1	Daily analysis	112
4.3.2	Market reaction determinants	113
4.4	Results	117
4.4.1	Descriptive statistics	117
4.4.2	Market reaction to resource/reserve disclosures	119
4.4.3	Determinants of market reaction to resource/reserve disclosures	120
4.5	Further analysis	124
4.5.1	Intraday analysis	124
4.5.1.1	Intraday market reaction	127
4.5.1.2	Intraday flow and other trading measures	129
4.5.2	Effect of capital expenditure and debt	131
4.5.3	Value of technical auditor	131
4.5.4	Positioning of geological expert's name in disclosure report	132
4.6	Sensitivity tests	132
4.6.1	Alternative measures of geological expert's proxy for size	132

4.6.2	Choice of alternative event windows.....	134
4.6.3	Quantile regression.....	134
4.6.4	Multicollinearity.....	134
4.6.5	Choice of performance benchmark.....	135
4.6.6	Country growth characteristics.....	136
4.6.7	Heteroskedascity test.....	136
4.6.8	Alternative specification for timing of disclosure.....	136
4.6.9	Sample partitioning.....	137
4.6.10	MDSE definition.....	138
4.6.11	Non-trading firms.....	138
4.6.12	Foreign projects.....	139
4.6.13	Selection bias test.....	139
4.6.14	Alternative data source.....	142
4.6.15	Cash flow effect.....	142
4.6.16	Firm age effect.....	143
4.6.17	Project equity adjustments.....	144
4.6.18	Abnormal volume turnover.....	144
4.7	Conclusions.....	144
4.8	Chapter 4 figures and tables.....	147
5.	SUMMARY AND CONCLUSIONS	164
5.1	Summary.....	164
5.2	Contributions and implications.....	165
5.3	Potential limitations.....	166
5.4	Suggestions for future research.....	167
6.	REFERENCES.....	170
7.	APPENDICES	179
	Appendix A: Abbreviation of geological experts' name used in this thesis.....	179
	Appendix B: Resource and reserve disclosure examples.....	181
	Appendix B.1: Example of disclosure 1 – Crusader 8 th August 2010.....	181
	Appendix B.2: Example of disclosure 2 – Crusader 18 th November 2010.....	189
	Appendix B.3: Example of disclosure 3 – Pioneer 15 th August 2011.....	194
	Appendix C: Alternative definitions of a specialist.....	199

Appendix C.1 - Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects based on client size	199
Appendix C.2 - Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects based on number of announcements.....	200
Appendix D: Description of data collected	201
Appendix E: Alternative measures for geological expert's proxy of size	204
Appendix E.1 – Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using individual brand effects based on commodity leaders	204
Appendix E.2 – Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using Big 2, Big 3, Big 4 and Big 5 alternative measures	205
Appendix F: Alternative model specifications	206
Appendix F.1: Ordinary Least Squares regression of (1, 3, 5, 10)-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using alternative event window	206
Appendix F.2: Quantile non-parametric regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects	207
Appendix F.3: Alternative reduced form Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories and reputation effects ...	207
Appendix F.4: Ordinary Least Squares regression of 2-day cumulative abnormal return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects	208
Appendix F.5: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels, reputation effects and gross domestic product.....	209
Appendix F.6: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels, reputation effects and geological expert disclosure location	210
Appendix F.7: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects clustered by year.....	211
Appendix F.8 Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects with disclosure timing control.....	212

Appendix F.9 Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using alternative price data provided by SIRCA.....	213
Appendix F.10: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and net operating cash flow	214
Appendix F.11: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and net operating and investing cash flow	215
Appendix F.12: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and number of days between the disclosure and firm age.....	216
Appendix F.13: Ordinary Least Squares regression of 2-day and 10-day abnormal volume turnovers return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects	217
Appendix G: Choice of performance benchmark	218
Appendix G.1: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using alternative performance benchmark	218
Appendix G.2: Cumulative market value of all non-disclosing MDSE firms in the sample	219
Appendix G.3: Level of alternative benchmark indices over time.....	219
Appendix H: Alternative sample partitioning.....	220
Appendix H.1: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using alternative sample windows under differing JORC revisions	220
Appendix H.2: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects in a sample excluding the year of GFC (2008)	221
Appendix H.3: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects including observations with resource and reserve downgrades or bad news events	222
Appendix H.4: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects examining the definition of MDSEs by excluding the largest firm	223
Appendix H.5: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects with base metals sample containing bad news	224

Appendix H.6: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects with sample restricted by firms with non-zero turnover.....	225
Appendix I: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects and project location abroad.....	226
Appendix J: Ordinary Least Squares regression of intraday abnormal 2-hour buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels	227
Appendix K: Ordinary Least Squares regression of 2-day buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and reputation effects using a sample for comparison with intraday tests	228
Appendix L: Test of reputation with sample divided by size deciles	229
Appendix L.1: Bid-ask spread by size decile during trading hours.....	229
Appendix L.2: Bid-ask spread by size decile during trading hours.....	229
Appendix M: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects of technical auditors	230
Appendix N: Determinants of choice of geological experts.....	231
Appendix N.1: Heckman test	231
Appendix N.2: Probit regression analysis of geological expert choice on firm size, commodity price, disclosure levels, capital expenditure and extreme high and low gross domestic product per capita	232
Appendix O: Joint Venture	233
Appendix O.1: Joint Venture interests.....	233
Appendix O.2: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels, reputation effects and project equity interest	233
Appendix P: Ordinary Least Squares regression of 2-day buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and reputation effects by alternative LME spot traded base metals commodity type sample configuration	234

LIST OF TABLES

	Page
Table 2.1: Stages of mine development lifecycle	35
Table 2.2: Sample selection.....	36
Table 2.3: Sample distribution by commodity type.....	36
Table 2.4: Market structure of geological experts across all commodities by year	37
Table 2.5: Market structure of leading geological experts by commodity group	39
Table 2.6: Descriptive statistics.....	49
Table 4.1: Descriptive statistics for market and commodity price variables	149
Table 4.2: Correlation matrix	151
Table 4.3: Market-adjusted mean abnormal returns (daily).....	153
Table 4.4: Significance tests on market-adjusted cumulative abnormal returns	154
Table 4.5: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price and disclosure levels.....	155
Table 4.6: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels and reputation effects.....	156
Table 4.7: Ordinary Least Squares regression of 2-day buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and reputation effects by commodity type	157
Table 4.8: Ordinary Least Squares regression of 2-day buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and switching from and to Big 4	158
Table 4.9: Intraday market reaction to resource and reserve disclosures using abnormal return, liquidity and bid-ask spread measures	159
Table 4.10: Ordinary Least Squares regression of 3-hour buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and disclosure levels and reputation effects	160
Table 4.11: Intraday market reaction to resource/reserve disclosures using intraday flow and other trading measures.....	161
Table 4.12: Ordinary Least Squares regression of 2-day buy-and-hold returns on resource/reserve categories, size, commodity price, disclosure levels and audit quality	162
Table 4.13: Ordinary Least Squares regression of 2-day buy-and-hold return on resource/reserve categories, size, commodity price, disclosure levels, reputation effects, capital expenditure and debt on resource and reserve disclosures	163

LIST OF FIGURES

	Page
Figure 2.1: JORC resource and reserve disclosure taxonomy.....	29
Figure 2.2: Distribution of geological experts by type	29
Figure 2.3: Distribution of the size (<i>GEO_SIZE</i>) of the top 100 external geological experts: 2004 to 2012.....	30
Figure 2.4: Number of geological experts by year	30
Figure 2.5: Distribution of the size (<i>GEO_SIZE</i>) of leading geological experts by commodity group.....	31
Figure 2.6: Geographical distribution of project domicile in resource/reserve disclosures	34
Figure 4.1: Daily abnormal returns over the 21-day (-10,0,10) window	147
Figure 4.2: Cumulative abnormal return over the 21-day (-10,0,10) window	147
Figure 4.3: Timing of resource and reserve disclosures	148